

▾ WHITE PAPER ON:

# A New Safety Standard for High Tech Products

## A new approach to safety for A/V and ICT equipment — IEC 62368-1

In January 2010, “IEC 62368-1 Ed 1.0: Audio/Video, Information and Communication Technology Equipment — Safety Requirements” was published as an international standard. The development is an outcome of almost eight years of planning, hard work and dedication by IEC TC108, the IEC technical committee responsible for standards for safety of electronic equipment within the field of audio/video, information technology, and communication technology.

This paper provides background on the new standard and looks ahead to the challenges and potential impact of its implementation.

### The Origins of IEC 62368-1

In the final years of the 20th Century, an explosion of multimedia technology began to erase the distinctions between different types of products. Suddenly computers, A/V equipment and other new information and communications technology became interconnected and interchangeable. Products originally designed for business came home, and electronic equipment long used almost exclusively by adults was mastered and embraced by children.

The industry recognized that existing standards could not keep up with the convergence of technology, and that a new standard was needed to replace IEC 60065, which governed safety of A/V equipment, and IEC 60950-1 (IEC 950 at the time), which governed safety of IT equipment, and formed the committee IEC TC108. The new technical committee’s charge was to develop a safety standard for information technology equipment, office appliances, consumer electronics and telecommunication terminal equipment, as well as combinations of each.

The new standard would be based on Hazard-Based Safety Engineering (HBSE) principles, a process that helps engineers integrate safety compliance early in the product design cycle, and supported by sound engineering principles, research and field data. TC108 outlined the following objectives for the new Standard:

- A single standard for a broad range of products, leading to design and manufacture of safe products
- Technology neutral, which facilitates innovation and technology commercialization
- Clear identification of the hazard being addressed
- Performance-based (rather than prescribed constructions), allowing proven prescriptive construction options, as warranted
- A (Type) test standard, but not a simple merger of IEC 60065 and IEC 60950
- Useful to designers, but suitable to assess conformance by suppliers, purchasers, and certifiers
- Harmonization with allowance for warranted national/regional differences.

Equally important was to attempt to meet all of the above in a user-friendly manner.

From the beginning, Underwriters Laboratories (UL) has played a significant role in the development of IEC 62368-1, directly within IEC TC108 and through leadership and participation in various National Committees for IEC TC108.



With this amount of involvement, both at leadership and expert levels, UL's insight and influence will certainly be valuable in preparing for the future implementation of IEC 62368-1.

## Considering the characteristics of IEC 62368-1

In preparing for this new standard for safety of A/V, information and communication technology equipment, the objective is to consider how it will be different than traditional standards that address safety of other forms of electronic equipment, including the standards it replaces.

IEC 62368-1 was developed using hazard-based safety engineering, and those familiar with basic HBSE realize that safeguards are critical in preventing energy hazards from doing harm. In the three-block model for safety, if safeguards are adequate, there will be no harm. (See Figs 1 & 2)



**Figure 1 – Three block model for pain and injury**



**Figure 2 – Three block model for safety**

The key new application processes associated with this standard include the identification and classification of energy sources, the identification of safeguards, and the evaluation of the suitability of these safeguards — through either prescriptive performance-based criteria (requirements) or prescriptive construction criteria (requirements). In fact, in keeping with one of IEC TC108's key objectives, the standard attempts to provide a performance-based option as the first option, with proven prescriptive construction options as alternatives. Performance-based requirements usually are preferred in this context since they tend not to hinder new technology and features. Usually any construction can be shown to be in compliance if it can comply with the performance criteria. This level of flexibility is not always possible with prescriptive construction criteria since the prescriptive requirements may have been developed with a different form of construction in mind when the technical committee originally adopted the requirements.

Many of the safeguards of IEC 62368-1 are required in existing standards as well, although they are not formally identified as “safeguards” the way they are in this new standard. For example, electrical insulation is one form of a safeguard that can be used to prevent risk of electric shock. Once the electrical energy source is classified, the level required and the appropriateness of the insulation is evaluated, in accordance with sub-clause 5.4. The actual requirements for the insulation are very similar to the requirements that are part of IEC 60065 and IEC 60950-1 today—such as prescriptive requirements for clearances, creepage distances, and solid insulation.

A similar process is used for identifying safeguards that are required to prevent electrically caused fire — again, based on the three-block model for safety.

In the case of electrically caused fire, two safeguards typically are required: (a) one (basic safeguard) in place under normal operating conditions and abnormal operating conditions, and typically proven by using materials not exceeding 90 percent of the material auto-ignition temperature, and (b) one (supplementary safeguard) in place against fire under single fault conditions. As in IEC 60950-1, the suitability of the supplementary safeguard can be demonstrated through either performance-based (single faults) or construction-based (fire enclosure) criteria.



A general (high-level) process for determining compliance with the main provisions of the standard can be summarized as follows:

- Begin with specific energy source/hazard (clause).
  - Step 1: Identify & classify each type of energy source independently for each hazard clause, e.g., for electrically caused injury, characterize each circuit as ES1, ES2 or ES3 (per Clause 5).
  - Step 2: After energy sources are classified, identify the safeguards required, and qualify them per either the prescribed, performance test, or construction option (alternative to performance test, when known).
  - Steps 1 & 2 are repeated for every similar energy source (e.g., circuit) as applicable
- Repeat cycle for each different type of energy source/hazard (e.g., mechanical energy (MS), radiation energy (RS), etc.)

It is expected that as the standard is put into use and users of the standard become more familiar with it and its approach to investigating electronic equipment, best practices will be identified that help increase efficient and effective use of the standard.

In terms of the First Edition of IEC 62368-1, it is also important to acknowledge that even with its initial publication the work of IEC TC108 is not complete. In fact, TC108 leadership has suggested that the First Edition of IEC 62368-1 is likely only to be used by a relatively small segment of the Industry and more widespread use of the standard not take place until its Second Edition, when many of the areas in need of further attention are addressed.

As aforementioned, UL has been intimately involved in the development process for the new standard and will continue to be involved with its continuing development and implementation. We are already in the process of applying the standard in actual product evaluations in order to better provide input into the next editions of the standard, develop tools to facilitate its use and also develop education programs for those who are interested in learning more about the standard.

*No matter what stage your company is in on its journey to safety compliance, UL will help you identify and implement the smartest, most efficient and effective solution based specifically on your company's needs. With a proven track record in product compliance developed over more than 115 years, UL is a respected third-party source to help manufacturers achieve total market access.*

*This is an introductory paper on materials preselection. This paper is intended for background information and discussion only.*

*This paper should not be relied upon for any purpose other than to gain an overview of this subject area. It is not legal advice and should not be treated as such. If you require specific advice on the subject, you should consult your legal advisors and relevant authorities in your operating jurisdictions.*